

Principles and Practices of a Research and Resource Management Program

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THE IDEAL SITUATION

From an ideal standpoint, a national park system area should have boundaries drawn for ecological reasons. Before any development or visitor use occurs, all park resources are inventoried and meticulously recorded into databases that can be retrieved to identify key indicators and processes. Monitoring programs, based on conceptual models of anticipated change, are in place and operated to provide early warning of natural and anthropogenic influences. Using an interactive Geographic Information System with detailed data, planning is completed for necessary park facilities, trails, roads, interpretation, and appropriate activities. Physical improvements are

constructed with sensitivity to resources and aesthetics. When the area opens to the public, on hand are the necessary staff and funding to scientifically investigate and monitor resources. Alternatives are developed by interdisciplinary teams of managers, resource managers, and scientists. Decisions are made in an atmosphere of understanding of the long-term consequences to park resources.

THE REAL WORLD

Unfortunately, the existing situation is far from the ideal. In the real world of park systems, such circumstances do not, and may never, exist. Instead, lands are inherited with built-in problems, such as pre-existing use patterns or facilities adjacent to sensitive resources. Rarely are there baseline resource data of existing conditions, nor a clear record of past activities. Even a complete bibliography or a repository of studies is a rarity. Existing staff and funding do not accomplish much more than maintain position against a myriad of internal and external pressures. Consequently, management makes development and policy decisions without the necessary data. Not unique to new park areas, even older, well-established areas often suffer from a lack of baseline information and a process to gather it. At Crater Lake National Park, established in 1902, the USNPS did not initiate baseline monitoring of the water quality of the lake itself until 1980—78 years later. However, to shut the doors to visitor use and associated development until the necessary scientific resource data are gathered is unrealistic and probably politically impossible, but

to continue making decisions without adequate information is a disservice to the resources and the public. It is the challenge of the USNPS to modify the "real world" with the tools it has in hand so the situation more closely approaches the "ideal."

DEVELOPING A BALANCE

Due to limited staff and funding, political pressures, and the immediacy of resource problems, parks spend an inordinate amount of time on so-called "brush-fire" issues. With baseline data unavailable, park staff must start from scratch each time a problem arises to collect data, assess impacts, respond to conflicting pressures, and develop mitigation strategies in a short time. Had baseline information been available, an issue may have been anticipated and mitigation alternatives more efficiently and effectively developed. In addition, many parks are completely absorbed in the operational demands of visitor services, law enforcement, interpretation, and maintenance. The constant operational demands and rapid response to "brush fires" focuses on short-term objectives and solutions. Long-term objectives are not thoughtfully developed or pursued, and long-term needs for data are rarely identified nor monetarily competitive with "brush fires." This becomes a vicious circle of having too many demands on staff time to develop, support, and continue programs necessary to gather, analyze, and assimilate data needed to make sound decisions. It is a system out of balance.

To cope with the inefficiencies of "brush-fire" management, parks need to develop and implement a

balanced program between the press of daily park operations, the planning required for program implementation, the identification of long-term objectives and strategies, the gathering of information through research and monitoring, and the mitigation of recognized impacts. This can be accomplished, even with low budgets, by a proactive approach and the application of the following field-tested principles and practices. For clarification, I have organized them into two logical groups: Relations with Research, and Resource Management Program Development.

PRINCIPLES AND PRACTICES

This list provides examples which managers, scientists, and resource management staff can apply to facilitate a balanced team effort. As good scientific research is the backbone of solid resource management, half of the list is about how management should relate to and solicit research and half is about how research is converted into sound resource management programs.

RELATIONS WITH RESEARCH

1. Understand the science process. Scientific research has a specific process that includes articulating research questions, developing a theory, collecting and analyzing data, drawing conclusions, writing up results and having them reviewed by peers, and preparing a final report. It is a process that may not fit within short time frames; however, its importance is recognized worldwide. Deviations or short cuts are quickly recognized and may leave the results and any management recommendations more

subject to question, criticism, or rejection by peers. Two time-consuming processes are the collection of enough data for a statistically valid sample and the thorough review by peers. Peer review and publishing provide scientists the opportunity to have their ideas and work scrutinized by others of similar expertise. This process strengthens the stature and credibility of the scientist, the data, and the decisions which are based upon the research.

2. Support research other than that which provides only direct, foreseeable benefits. Due to the complexity of park resources, not all of ecosystem dynamics are readily discernible to science. A study today that seems to have no direct value to park management may have high importance in the future. Even if this type of research cannot be directly funded, it can be supported by logistics or work space. At a minimum, research that increases our knowledge about park resources and their interactions should be encouraged.

3. Recognize that research does not make management decisions. Research itself will not, even with well-developed management recommendations, make management decisions. At best, research will provide a range of possible consequences to resources resulting from management action or inaction. The decision still remains with management and must be considered with all other consequences to operations, visitor use, public opinion, etc. All too often we hear "I need answers!" Research will provide answers to research questions; if those questions are well-formulated with input from management, the re-

search results will go a long way toward providing viable solutions.

4. Learn what scientific capabilities are available in your area. Managers should know what special areas of expertise are available in the region, and in other park system areas. In addition to in-house capabilities, local and regional educational institutions should be investigated for specific expertise. University-based scientists have ready access to other specialists and university libraries. Knowledge of other land management agency expertise is also invaluable. For example, existing agreements between the USNPS and the U.S. Forest Service allow parks to tap into the extensive expertise of USFS fire specialists and scientists. State and provincial fish and game agencies and park systems also often have expertise in managing wildlife populations. If managers do not know the answers to resource questions, they should at least know whom to ask.

5. Encourage research through offering operational support. Research by independent scientists and universities should be encouraged through offering a basic level of support. Working in a U.S. National Park System area has an intrinsic appeal that many scientists find irresistible. USNPS areas can capitalize on this appeal without taking advantage of the researcher and without overwhelming the park operation. Valuable research from independent scientists and universities can be obtained with a minimum of expenditure through offering basic amenities such as work space, low-cost housing, laboratory space, library or collection access, or logistical assistance. Careful screening of who can use the park offer-

ings is as important as controlling the numbers. At Crater Lake National Park, former USNPS quarters were converted to provide housing for visiting researchers. This provided an atmosphere for informal exchange among visiting scientists as well as providing low-cost housing in a remote location. In U.S. national parks, the Volunteers in Parks (VIP) program may be used to register visiting researchers; other park systems may have similar programs. This provides some small monetary compensation and legal use of government facilities and equipment.

6. *Communicate research needs to local educational institutions.* Once an area has determined its research needs within the process of a resource management plan, a list should be prepared of suggested research topics or projects and provided to universities. Included in this list should be the contact person's name and a list of the minimum operational support offerings (logistics, housing, work space) that the park can offer.

7. *Identify the research problem clearly.* Good problem identification is essential to developing a sound research proposal and achieving the desired results. Management questions must be well thought-out and articulated before initiating any research. Developing the question(s) can most effectively be done as a joint effort between researchers and managers. During this process, a closer accord can be reached between the desires of management and the capability of research. Managers have a responsibility to clearly articulate their needs, and scientists have a responsibility to articulate the limi-

tations of a specific research project.

8. *Ensure that park-supported research relates to resource management objectives.* With limited funding and staff, park-sponsored research should relate to a specific resource management objective as identified in a resource management plan. Such a relationship will instill a greater desire by park staff to support the research operation and a higher chance that the results will be used.

9. *Inform scientists of the needs of management.* Through early meetings, scientists should be made aware of the needs of management in relation to a particular project. Managers need facts before they can make decisions and the facts need to be scientifically based and capable of withstanding scrutiny by other specialists in a public or legal forum. Because managers need information in relatively short time frames, interim results are helpful. Managers like "catchy" quotes or phrases that reach to the heart of the issue but are based on defensible data.

10. *Inform researchers of management constraints.* Researchers should be informed of expectations, rules, regulations, constraints, and the relevant land-management philosophy. Researchers are generally responsible individuals with sensitivity to park system concerns and will follow rules and regulations if informed beforehand. They should be informed also of the "whys" of the regulations. Exceptions to the rules and regulations should be applied only with justification and prior permission. Parks should develop a written statement or checklist about conducting research in their park. The statement

can accompany collecting permits or responses to research proposals.

11. Assign a park-based liaison as the contact with researchers. Researchers should have a park-based liaison who understands their needs, the value of the projects, and the requirements of the area. This liaison should facilitate research accomplishments without subjecting a visiting researcher to the confusing park organizational structure and protocol.

12. Encourage and provide the opportunity for researchers to present briefings. Researchers should be requested to make formal and informal presentations to the staff on the intent and findings of their research. This type of presentation is an excellent method of communicating research information to park staff. Requiring researchers to present such talks is generally easy to negotiate. For contracted research, this requirement should be placed in the contract. For volunteer researchers, it can be requested in exchange for logistical or other staff assistance. Researchers should also be requested to present programs directly to the public in a park setting.

13. Monitor research closely. Research within park areas should be monitored to ensure that it is not damaging or consuming resources. The basic premises of resource preservation must be remembered in initiating any park-based research. The long-term impacts of consumptive research must be weighed as would any proposal affecting park resources. If necessary, alternative areas outside the park boundaries or alternative techniques may be employed or negotiated so research can still be completed with a minimum of impact on park resources.

14. Regularly review ongoing research. Ongoing research should be regularly reviewed to ensure that the research is on track and responding to the needs of management as originally intended. As new information becomes available, research may be adjusted to better apply to the needs of management. Interim reports and regular contact are essential to ensuring that the work is being carried out as envisioned. Changes in mid-project can be sensitive situations and should be carefully approached and mutually negotiated. Mid-project modifications can be best avoided through open, early design discussions.

15. Request management recommendations or implications in final research reports. Park-supported research should, where appropriate, provide alternative management recommendations or implications as a part of the final report. Not all research can appropriately provide management recommendations, and some researchers may be uncomfortable in doing so. If researchers are provided a clear understanding of management constraints, the alternative management recommendations will be more practically applicable. The researcher needs to realize these are recommendations only and may be adopted, rejected, or modified as necessary.

16. Provide management feedback to researchers. Researchers should receive notice that their research is being applied, providing the framework necessary for future working relationships. Feedback also allows for evaluating the work's applicability and for refining future studies. When specific applications of research results are envisioned beyond the scope of the

original work, the researcher should be contacted for a discussion of applicability.

17. Communicate research to park staff. Research plans, progress, and reports should be shared and interpreted to field and administrative staff. Field staff who provide logistical support should receive feedback on their efforts and benefit from the research project information. To send out a 300-page dissertation with a routing slip ensures that the information would be read by few if any of the park staff. To send the document with a one-page summary discussing implications for the management of the park would ensure greater interest. The resulting higher level of interest improves future field support for research.

18. Co-author articles between managers and specialists. Managers and specialists should work together to publish articles on programs that involve a successful collaboration between scientists and managers. Such publications would create a medium for better understanding each other's needs and a forum for information exchange.

DEVELOPING A RESOURCE MANAGEMENT PROGRAM

19. Develop clear resource-oriented management objectives. Often, management objectives are oriented toward serving visitors without identifying the necessary studies, inventories, or mitigating actions. Resource management or science staff should be closely involved in the development of management objectives so that resource concerns are articulated. Broad management objectives, as well as the specific resource management

objectives, should include short- and long-term information needs and the methods to obtain the information.

20. Identify research and resource management needs with an interdisciplinary team. Identifying, documenting, and prioritizing research needs and resource management projects should be an interdivisional, interdisciplinary process. This should include participation from interested field staff in all divisions, including seasonals, because of their exceptional firsthand knowledge of the resources. Likewise, assistance should be sought from visiting researchers or park-system scientists based at universities in defining research questions or resource management problems.

21. Convert management recommendations and research results into practical and affordable programs. Management recommendations are seldom in a form that can be easily or directly implemented. Converting results of research into practical programs requires understanding the constraints, options, funding, and staffing limitations. This responsibility for translation should be assigned to the staff person with the greatest understanding of operations and the meaning of the research. In complex situations, interdisciplinary strategy teams should be used.

22. Ensure resource management programs are marketed. Resource management programs of mitigation or monitoring that require support from field staff should be well thought-out, organized, and marketed. Park field staff most often already feel a burden of too much work and not enough time or money. Additional work is often looked on with

suspicion and received with less than enthusiastic support. A new resource program should be designed to fit into other operational duties. The importance of the project must be marketed to field staff in such a manner that they understand and support the idea. If they see how a project would benefit their operation or the resource, or how they would learn a new skill, or enhance their professional knowledge, they will more enthusiastically support the program.

23. *Ensure that resource management programs are logical.* Resource management programs that require support from field staff must be logical. Projects that require time commitments and major shifts in other operational requirements are less likely to be supported. Locating sampling points, for example, along regularly traveled patrol routes provides a better opportunity for field staff to assist in data collection. A remote location may be slightly better in terms of representation of a particular resource, but it is wasted if too remote to allow regular access and data collection.

24. *Design resource management programs for quality.* Resource management programs should be designed for quality rather than quantity. "Brush fire" management attempts to solve all problems at once but none very well. Resource management programs should be developed with goals, priorities, and high standards. Using action plans or task directives to outline the chronological events, allocate funding, and set standards for implementation are excellent tools in establishing quality programs. Accountability, tracking, follow-up, and periodic review of the actions

are important in maintaining high standards.

25. *Make baseline monitoring a high-priority program.* Each park should set a high priority for baseline monitoring of specific indicator resources. It is never too early to start a baseline monitoring program, but it can be too late. Long-term monitoring is the best method to watch and interpret trends of change in park resources that may be human-caused and is the best way a database can be developed for future decisions. Baseline monitoring programs should have periodic professional review to ensure the data are collected in a manner that serves the purposes of the program, i.e., it can be statistically analyzed, and is responsive to the changes that are anticipated.

26. *Institutionalize long-term monitoring and resource management programs.* The key to success of long-term programs is often linked to low turnover in staff; however, park systems may have a relatively high level of transfer and turnover. By working to institutionalize resource management and monitoring programs into day-to-day operations, there is greater assurance that they will be continued. Important long-term resource programs should become such a part of the operation that they are as routine as fee collection or road patrol. This technique can be accomplished by establishing long-term monitoring and resource programs within the Resource Management Plan, parkwide and district annual work plans, and individual performance standards.

27. *Make research data and resource management information retrievable.* Research data and resource monitoring information

should be organized and stored in such a manner that the information is retrievable and capable of being compared and analyzed. Managers in the future will need to analyze increasingly large databases with a multitude of interrelated factors. The sheer volume of information will require that data be manipulated by automated data processing (ADP). Already a backlog of information exists to be entered, a backlog that seems almost insurmountable; however, parks should begin to create and enlarge databases for analyzing resource trends. Small databases can be easily managed with "off-the-shelf" data management software. The most efficient process is to enter data at the time the information is collected. Field data sheets should be modified, if necessary, to facilitate entry of data into ADP systems. Mappable data should be collected at a specified standard and stored for entry and use in Geographic Information Systems.

28. *Communicate resource projects to the public.* The reasons for and the results of resource projects should be effectively communicated to the public through the various media. Park visitors generally are interested and educated users. They are the grass roots supporters of the park system and its programs for resource protection. Their support becomes stronger and more effective to the degree they understand the varied resources. Short articles on resource projects should be presented in park newspapers or other park publications. Where possible, a research or resource management field team should be accompanied by someone with interpretive skills who can discuss the project on site with interested visitors.

29. *Use the news media effectively to sell resource management programs.* Resource managers should learn to use the news media effectively to deliver information about its programs. The news media is often willing to come to a park for a story about research findings, ongoing research, and resource programs. Good press contacts should be established and cultivated so that they increase the opportunity for balanced handling of controversial issues. Press releases on resource issues are an important tool and should contain specific quotes and short clear phrases to be used verbatim by the media.

30. *Accomplish resource management goals through strategic planning.* Achieving resource management goals is most frequently affected by a variety of interrelated factors, such as funding, staffing, time, politics, communication, meetings, planning, logistics, and personalities. The key to managing these factors is strategic planning. Strategic planning is best done on paper, with each step articulated and timed for the greatest effectiveness. This planning is especially effective when done with a team of interested and informed staff identifying and assigning each task for completion in a logical, chronological order.

SUMMARY

A park system has the overwhelming responsibility of managing and protecting complex resources in the midst of increasing threats. A past lack of emphasis on data gathering, resource monitoring, and research, coupled with a focus on daily "brush-fire" issues, has brought the USNPS to the point of dealing with increasingly complex

problems with a deficiency of information. Barring a major overhaul of the park system's organization to dramatically increase the number of scientists within the organization, parks must evaluate their own programs and use tested practices to incorporate research and monitoring from all available sources into park operations. This will assist parks in using the best available knowledge to develop mitigation strategies, implement monitoring programs that are worthwhile and practical,

and gather necessary data to interpret and respond to unforeseen change brought on by human actions. These practices and principles are simple in concept yet require constant attention and the commitment of park management. No one practice stands alone, but when all are applied in concert, a balance is achieved, and these practices become a strategy for solid management of park resources for the future.

REFERENCE LIST OF PRINCIPLES AND PRACTICES FOR RESEARCH AND RESOURCE MANAGEMENT

Relations with Research

1. Understand the science process.
2. Support research other than that which provides only direct, foreseeable benefits.
3. Recognize that research does not make management decisions.
4. Learn what scientific capabilities are available in your area.
5. Encourage research through offering operational support.
6. Communicate research needs to local educational institutions.
7. Identify the research problem clearly.
8. Ensure park-funded or -supported research relates to resource management objectives.
9. Inform scientists of the needs of management.
10. Inform researchers of management constraints.
11. Assign a park-based liaison as the contact with researchers.
12. Encourage and provide the opportunity for researchers to present briefings.
13. Monitor research activity closely.
14. Regularly review ongoing research.
15. Request management recommendations or implications in final research reports.
16. Provide researchers with feedback from management.
17. Communicate research to park staff.
18. Co-author articles between managers and specialists.

Developing a Resource Management Program

19. Develop clear, resource-oriented management objectives.
20. Identify research and resource management needs with an interdisciplinary team.
21. Convert management recommendations and research results into practical and affordable programs.
22. Ensure that resource management programs are marketed.
23. Ensure that resource management programs are logical.
24. Design resource management programs for quality.
25. Make baseline monitoring a high-priority program.
26. Institutionalize long-term monitoring and resource management programs.
27. Make research data and resource management information retrievable.
28. Communicate resource projects to the public.
29. Use the news media effectively to sell resource management.
30. Accomplish resource management goals through strategic planning.



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By now, all Society members, as well as the institutions on the Forum mailing list, should have received an announcement/call for papers giving initial details of the Society's Seventh Conference on Research and Resource Management in Parks and on Public Lands. If you are thinking of joining us in Jacksonville, please return the preaddressed postcard that was included with the announcement. When you do, we'll put you on the mailing list to receive a conference registration packet, which will be available starting in February. If you don't have the preaddressed postcard, simply send us your name and mailing address via mail or fax. *Remember: the registration packet will be sent only to those who request it!* Also keep in mind that the deadline for poster & paper abstracts is February 15. Send all cards, abstracts, and other correspondence to the GWS, P.O. Box 65, Hancock, MI 49930-0065 USA, or fax to (906) 487-9405. For more information, give us a call at (906) 487-9722.